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BOYDSTUN METAL WORKS (and Western Machine, Portland Blast Media) CSM Site Summary

BOYDSTUN METAL WORKS (and Western Machine Works, Portland Blast Media)

Oregon DEQ ECSI #2362

9002 N. Sever Court (Burgard Industrial Park)
DEQ Site Mgr: Alicia Voss
Latitude: 45.6091°
Longitude: -122.7697°
Township/Range/Section: 2N/1W/35

River Mile: 4.2 East bank

LWG Member ☐ Yes ☒ No

Upland Analytical Data Status: ☐ Electronic Data Available ☒ Hardcopies only

1. SUMMARY OF POTENTIAL CONTAMINANT TRANSPORT PATHWAYS TO THE RIVER

The current understanding of the transport mechanism of contaminants from the uplands portions of the Boydstun Metal Works (southeast facility), Western Machine Works, and Portland Blast Media facilities to the river is summarized in this section and Table 1, and supported in following sections.

1.1. Overland Transport

Boydstun Metal Works, Western Machine Works, and Portland Blast Media are located in the southeast area of the Burgard Industrial Park (see Figure 1). This area is landlocked and is located over 1,000 feet from the International Terminals Slip and 0.5 mile from the main stem of the river. Other than communal stormwater runoff to private Outfall 18 (WR-123) within the slip, there does not appear to be direct migration pathways for contaminants originating in this area to reach the river.

1.2. Riverbank Erosion

Not applicable to these properties.

1.3. Groundwater

No preferential pathways for groundwater movement have been identified at Boydstun Metal Works (southeast), Western Machine Works, or Portland Blast Media. Any potential groundwater transport of contaminants will likely be in the general direction of groundwater flow which is anticipated to be to the west toward the Willamette River. However, the site-specific groundwater flow direction and gradient have not been determined. Insufficient data are available to assess whether low concentrations of chlorinated solvent and metals impacts to groundwater at the site is a current or historic source of contamination to the Willamette River or the International Terminals Slip.

1.4. Direct Discharge (Overwater Activities and Stormwater/Wastewater Systems)

Stormwater from drainage basin 18, encompassing Boydstun, Western Machine Works, Portland Blast Media, and other properties, is routed to a shared storm drain system that empties into the slip through private Outfall 18 (WR-123). Only Boydstun and Portland Blast Media have NPDES permits. Historically stormwater in this area either infiltrated directly to the ground or evaporated.

1.5. Relationship of Upland Sources to River Sediments

See Final CSM Update.

1.6. Sediment Transport

Not applicable to these properties.

2. CSM SITE SUMMARY REVISIONS

Date of Last Revision: March 4, 2005

3. PROJECT STATUS

Activity		Date(s)/Comments
PA/XPA	☐	
RI	☒	Phase I and II RI for Burgard Industrial Park (Bridgewater 2002a, 2003a)
FS	☐	
Interim Action/Source Control	☐	
ROD	☐	
RD/RA	☐	
NFA	☐	

DEQ Portland Harbor Site Ranking (Tier 1, 2, or 3): Tier 2

4. SITE OWNER HISTORY

Primary Sources: Bridgewater 2000a, DEQ 1999

Owner/Occupant	Type of Operation	Years
Boydstun Metal Works (ECSI# 2362)		
Schnitzer Investment Corp./Boydstun Metal Works (lessee)	Limited manufacturing and equipment maintenance	1995 - present
Schnitzer Steel. Inc.	Truck maintenance and repair	Late 1970s – early 1990s
Consolidated Freightways	Unknown	1968 - 1972
Western Machine Works (no ECSI#)		
Schnitzer Investment Corp./Western Machine Works (lessee)	Metal parts fabrication	1989 - present
Schnitzer Steel, Inc.	Truck maintenance and repair	1972 - 1989
Portland Blast Media (no ECSI#)		
Schnitzer Investment Corp./Portland Blast Media (lessee)	Drop box container sandblasting and painting	1994 - present
Schnitzer Steel, Inc.	Railroad crane maintenance and repair	Early 1990s - 1994
Overall SE Area (no ECSI#)		
Various owners and lessees, including Metra Steel Corp., Schnitzer Steel, Inc., Dulien Steel	Unknown, mixed uses	1945 - 1972

Products, Inc., Owen & McIntrye Electric Co.		
U.S. Government, City of Portland, Oregon	WWII shipyard salvage area	1941 - 1945
Gatton Family	Undeveloped	Prior to 1941

5. PROPERTY DESCRIPTION

Boydstun Metal Works, Western Machine Works, and Portland Blast Media are three of eight tenants in the Schnitzer Burgard Industrial Park, which is located at RM 4.2 on the northeast bank of the Willamette River (Figure 1). Altogether, these three tenants occupy a triangular-shaped, 4.5-acre parcel located in the southeast corner of the park (Figure 1). The southeast area is fenced and zoned for heavy industry; a majority of the site is paved. It has a slight grade toward the west.

Currently, Boydstun operates from three buildings onsite, including a prefab office building, a lower shop for fabricating trailers, and an upper shop that houses the paint booth. Oil/water separators are located in the pavement north and south of the main building. Until 2000, Boydstun also leased a 1-acre area and building located west of the Western Machine Works building (see Figure 1). This building is currently empty. Portland Blast Media is located south of the current Boydstun operation and operates out of two permanent buildings and two temporary shelters. A wash pad is located east of the north building. Wash water is discharged to the municipal sanitary sewer system. Western Machine Works occupies the large 72,000-square-foot building that is centrally located in this area (Bridgewater 2000a).

Two groundwater industrial supply wells (Wells Nos. 3 and 5) and their associated pump houses installed in 1943 for the Oregon Shipbuilding Corporation are located near the eastern boundary of this area (see Section 10.2 for additional information).

The southeast area encompasses drainage basin 18, which was not included in the overall stormwater BMP assessment performed by Bridgewater (2003b) for Schnitizer Investment Corporation. Stormwater runoff from paved portions of the southeast area is routed through a series of catch basins and an oil/water separator before discharging through private Outfall 18 (WR-123) into the slip. Filter socks and straw bales are placed around the catch basins to capture particulates. Boydstun and Portland Blast Media have individual NPDES 1200Z stormwater permits for their discharges. Western does not have an NPDES stormwater permit (Bridgewater 2000a, 2003b). A site drainage map for the Boydstun property is shown on Supplemental Figure 2 (Columbia West Engineering 2001).

6. CURRENT SITE USE

Boydstun Metal Works - SE Facility. Boydstun manufactures automotive trailers for commercial haulers and modifies trucks to accommodate automotive hauling and the assembled trailers. The southeast facility was the primary facility until recently, when it was moved to the northern location (see Boydstun NE Property in *Noncontiguous Burgard Industrial Park* site summary). Current activities at the southeast facility include limited manufacturing and maintenance. Washing of assembled trucks and trailers is performed at this location. There are four aboveground storage tanks for used oil, hydraulic oil, lubricating oil, and diesel located at the site (Bridgewater 2000a; EMS 1998).

The site was listed as a RCRA large-quantity generator in 2000, and Boydstun's waste streams at that time included spent solvent, lacquer paint thinner, still bottoms, and paint-related wastes. Boydstun is currently a conditionally exempt generator.

Western Machine Works. Western Machine Works repairs, machines, and constructs industrial parts in a facility located in the southeast corner of the Burgard Industrial Park, adjacent to Boydstun Metal Works. Primarily activities include repairing bearings for paper rollers and machining metal shafts for the paper and pulp industry. Machining is done using lathes and a grinder. Water-based cutting lubricants are used to cool the machines, and a hot-water parts washer cleans bearings before repair.

Limited painting and application of polyurethane coatings is done in an enclosed paint booth.

One aboveground storage tank for waste oil is located on the exterior wall of the building. Lubricants, oil products, paints, and solvents are stored in a shed adjacent to the waste oil tank. Waste streams include cutting lubricants, used lubricating oils, wash water, waste solvents, waste dye, and metals shavings.

Western does not have a stormwater permit. Catch basins are surrounded by straw bales and contain fabric filters that are changed routinely (Bridgewater 2000a).

Portland Blast Media. This 2-acre facility is located in the southeast corner of the Burgard Industrial Park. There are two permanent buildings and two temporary shelters. Portland Blast Media sandblasts and paints solid waste and recycling drop box containers. Blasting is conducted in a temporary shelter on the northwest corner of the property. Magnesium, iron, and aluminum oxide silica are used as blast materials. These materials were tested for leachable metals, and the concentrations were determined to be within acceptable waste limits (EMS 1998). However, EMS noted that the blast media would not be considered suitable for fill and should continue to be removed and disposed of offsite. Painting is performed in an enclosed paint booth. Small quantities of paint and paint supplies are stored in another permanent building. A large portion of the site is unpaved. An industrial water supply well (Well No.3) located in a pump house east of the north building is unused (Bridgewater 2000a).

An outside wash pad drains to a sump that leads to the onsite stormwater system. A sink in one of the buildings also drains to the sump. Two catch basins contain fabric filters. Portland Blast Media has an NPDES stormwater permit and a Stormwater Pollution Prevention Plan.

7. SITE USE HISTORY

There is no specific information for the southeast portion of the Burgard property prior to WWII. Some bulk oil storage may have occurred in this area. According to Bridgewater (2000a), this corner of the property was used as a salvage area during the time of the WWII shipyard. Given the shortage of raw materials during the war years, maximizing recovery of all materials was of great importance. Refuge and scrap materials from all areas of the shipyard were collected in this area. Electric cable ends were reportedly burned here so that lead could be recovered from the wires. Refuse was disposed of in the "City Incinerator" (Osborn 1945). Between 1945 and 1972, industrial use was limited following dismantling of the shipyard, but activities included metals fabrication, salvage operations, and upland log storage. Consolidated Freightways purchased the property in 1968.

In recent years, the general area has been used as a metals scrap yard, sand-blasting area, and for equipment manufacturing. Schnitzer purchased the southeast property in 1972 for use as a truck maintenance and repair area. Most of their activity occurred in the former salvage building. Western Machine Works began operating in 1989. Boydstun leased their portions of the property in 1995 for the manufacturing of truck trailers, including assembly and painting. In 2000, Boydstun ended their lease of the 1-acre parcel in the southeast corner of the park; however, they still occupy the easternmost building on this parcel. Portland Blast Media began their sandblasting and painting operation in the late 1990s (EMS 1997; Bridgewater 2000a,b).

8. CURRENT AND HISTORIC SOURCES AND COPCS

The understanding of the historic and current potential upland and overwater sources at the site is summarized in Table 1. The following sections provide a brief overview of the potential sources at the site requiring additional discussion.

8.1. Uplands

Several industrial operations have occurred on the Burgard property in the past 50-60 years, including a former shipyard. Soil and groundwater may be contaminated by past and current

practices. As discussed further below, stormwater runoff from ground surfaces, especially areas stained with oil or hydraulic fluids, could be considered an upland contamination source.

According to Bridgewater (2000b), the southeast Boydstun parcel has an oil storage area on the eastern boundary of the property that has evidence of heavily stained concrete. This area is covered and contains a 1,000-gallon hydraulic oil tank, a solvent recovery still, a smaller tank of used oil, and drums of lubricating oil. A compressor located west of the main building drains to the pavement. Stained concrete was identified beneath two rail-mounted cranes, a portable hydraulic lift and plasma cutting tables, and in a concrete-lined trench in the maintenance area at the southeast facility. The concrete pad apron around the oil storage containment area was also stained, suggesting possible releases to soil in this area. An inactive well (Well No. 5) is located in a pump house in this area. It is not known if it was abandoned in accordance with Oregon rules (Bridgewater 2000b).

Near-surface soil contaminated with heavy oil, PAHs, and metals has been detected at the Portland Blast Media wash pad and at the Western Machine Works compressor areas (discussed further in Section 10.1.1). This soil could be considered an upland contamination source if it becomes entrained in surface water runoff from this area. The potential also exists for the soil contamination to impact groundwater and ultimately the river (Bridgewater 2002a).

Low concentrations of VOCs (chlorinated solvents) and dissolved metals have been detected historically in the alluvial groundwater zone in this area. The highest concentrations of chlorinated solvents were detected along the eastern edge of the facilities, likely upgradient with respect to the general direction of groundwater flow. The source and extent of the chlorinated solvent plume is unknown.

8.2. Overwater Activities

☐ Yes ☒ No

8.3. Spills

No documented spills at the Boydstun SE, Western Metal Works, or Portland Blast Media properties were found either from DEQ's Emergency Response Information System (ERIS) database for the period of 1995 to 2004, from oil and chemical spills recorded from 1982 to 2003 by the U.S. Coast Guard and the National Response Center's centralized federal database [see Appendix E of the Portland Harbor Work Plan (Integral et al. 2004)], from facility-specific technical reports, or from DEQ correspondence.

9. PHYSICAL SITE SETTING

The Schnitzer Burgard Industrial Park is generally level with ground surface elevations ranging between 20 and 30 feet above msl. The topography gently slopes from east to west across the site, with the exception of a steep embankment along the Willamette River and the slip channel (DEQ 1999). Boydstun Metal Works historically operated in the southeast corner of the Schnitzer Burgard Industrial Park (see Figure 1) until 2000 when Boydstun moved the majority of its operations to a facility in the north corner of the Schnitzer Burgard Industrial Park. Western Machine Works and Portland Blast Media are located adjacent to Boydstun Metal Works (southeast).

The Schnitzer Burgard Industrial Park lies along the northeastern bank of the Willamette River where deposits from high-energy Pleistocene floods formed a peninsular terrace at the convergence of the Willamette and Columbia rivers. The southern two-thirds of the Schnitzer Burgard Industrial Park lies within the Willamette River's 100-year-flood zone (DEQ 1999).

9.1. Geology

The near-surface geology at the Schnitzer Burgard Industrial Park is dominated by the presence of dredge fill placed during the development of the industrial park in the late 1930s and during

filling of the shipways in the later 1960s and early 1970s. The dredge fill, consisting of a mixture of brown sand and silty sand, varies in thickness across the Schnitzer Burgard Industrial Park from 25 to 35 feet along the river and thinning to 15 feet along the eastern edge of the site (Bridgewater 2001).

Limited site-specific investigation information is available for Boydstun Metal Works (southeast), Western Machine Works, and Portland Blast Media. In 1997, EMS completed 4 tests pits and 15 boreholes in November and December 1997 to investigate subsurface conditions in the area [see Supplemental Figure 2 from EMS (1998)]. The tests pits extended to a maximum depth of 15 feet bgs, and the boreholes extended to a maximum depth of 20 feet bgs. Bridgewater Group (2002a) completed an additional four soil borings in late December 2001 and early January 2002. These boreholes extended to a maximum depth of 32 feet. For additional information on subsurface lithology and soil and groundwater contamination, see Supplemental Figure 2-2 from Bridgewater (2002a).

Based on the site investigation work, the stratigraphy at the site appears to be similar to that of other Schnitzer Burgard Industrial Park areas. Soil probe borings completed at the site indicate dredge fill from less than 1 to 14 feet in thickness. Alluvial deposits consisting of silts, sandy silt, and silty sand underlie the dredge fill to the maximum depth explored (32 feet bgs). An industrial water production well (State well record MULT 1824) completed at an adjacent property to the west (Northwest Pipe Company) indicates that silt, sandy silt, and silty sand are present to a depth of 124 feet bgs. Below this, the Quaternary deposits consist of coarser material composed of sand and gravel and may represent the Pleistocene flood gravels; the coarser sand and gravel was present to a depth of 220 feet bgs (CH2M HILL 2000). The coarser-grained material may represent Pleistocene flood gravels (Quaternary deposit) and/or possibly the Troutdale Formation. Between 220 and 258 feet bgs, silty clay and clay with minor lenses of gravel were noted (CH2M HILL 2000). The latter unit may represent the Sandy River Mudstone.

No site-specific cross sections have been constructed for these facilities during past investigations. The stratigraphy at the site is depicted only in the direct push soil boring lithologic logs completed by EMS (1998, Table 1) and Bridgewater (2002a, Appendix A).

9.2. Hydrogeology

Localized zones of perched groundwater may be present within the dredge fill. Such perched zones have been encountered at a depth of about 15 to 20 feet on nearby properties. The presence and extent of the perched zones is expected to be variable and related to the presence of silt content within the dredge fill. The groundwater flow gradients in the perched zones are anticipated to be variable and relatively low; discharge from the perched groundwater zones either discharges toward the river or infiltrates downward into the underlying dredge fill and alluvial deposits (Bridgewater 2001). A more continuous, unconfined, groundwater zone is anticipated within the upper portions of the alluvial deposits underlying the dredge fill (Bridgewater 2001) and potentially including the lower portions of the dredge fill itself. The groundwater flow direction in the alluvial groundwater zone is generally to the west, toward the Willamette River, with local variations in groundwater flow expected. The alluvial groundwater zone is anticipated to discharge to the river (Bridgewater 2001). However, site-specific information related to the groundwater flow direction and gradient was not available in the DEQ records.

During completion of soil probe borings at Boydstun Metal Works (southeast), static water levels were obtained in the soil probe borings before groundwater sampling and backfilling (Bridgewater 2002a). The depth to groundwater ranged from 26.8 to 28 feet bgs in three of the four borings, with the fourth having a depth to water between 16 and 20 feet bgs. The shallower depth to groundwater observed in the one soil boring was not explained by Bridgewater (2002a).

10. NATURE AND EXTENT (*Current Understanding*)

The current understanding of the nature and extent of contamination for the uplands portions of the site is summarized in this section. When no data exist for a specific medium, a notation is made.

10.1. Soil

10.1.1. Upland Soil Investigations

☒ Yes ☐ No

Boydstun Metal Works. A level II environmental sampling study of the southeast Boydstun property was performed by EMS (1998), which consisted of limited test pit [using an organic vapor monitor (OVM)], borehole, and surface sampling. The OVM readings did not indicate any subsurface contamination. PAHs, PCBs, and TCLP lead were detected in TP-1, above DEQ's industrial maximum allowable soil concentrations (OAR 340-122-045) for those analytes. PCBs were detected in two of 14 samples at 15.3 ppm and 0.5 ppm, which are within the range of DEQ cleanup criteria [see Supplemental Figure 2 from EMS (1998)]. However, EMS concluded that the limited area of PCB soil contamination did not pose a threat to the Willamette River, due to the large distance from this area to the river and the essentially insoluble nature of PCBs.

Western Machine Works. Soil and groundwater sampling was performed on this property in 1997. EMS (1998) concluded that the investigation "...did not detect widespread contamination associated with prior land use of the subject property." No petroleum hydrocarbons were detected in the area of the former underground storage tanks. Bridgewater (2002a) collected soil samples in this area during their RI and found total PAHs at 1,466 mg/kg in a 1-foot sample collected from PP-2, located near the Western Machine Works air compressor.

Portland Blast Media. Soil samples were also collected by Bridgewater (2002a) in the SSI's southeast area. Minimum and maximum concentrations are provided below:

Analyte	Minimum Concentration (mg/kg)	Maximum Concentration (mg/kg)
Total Petroleum Hydrocarbons (TPH)		
TPH- Heavy Oil Range	100 U	1,520
Polycyclic Aromatic Hydrocarbons (PAHs)		
Benzo(a)anthracene	--[a]	0.48
Benzo(a)pyrene	--	0.742
Benzo(b)fluoroanthene	--	0.73
Benzo(g,h,i)perylene	--	0.975
Benzo(k)fluoroanthene	--	0.684
Chrysene	--	0.692
Fluoranthene	--	0.782
Pyrene	--	0.952
LPAH	--	0.295
HPAH	--	6.957
Metals (total)		
Arsenic	2.48	5.18
Barium	80	163
Cadmium	0.5 U	2.47
Chromium	7.33	71.4
Copper	13	177
Lead	5.77	222
Mercury	0.1 U	0.811
Nickel	11.1	33.5
Zinc	48.3	775

mg/kg = milligrams per kilogram (ppm)
U = Not detected at noted reporting limit
[a] Only one sample was analyzed.

Heavy oil was detected in a single sample at a maximum concentration of 1,520 mg/kg at a depth of 1 foot from PP-4, located immediately east of the Portland Blast Media wash pad [see Supplemental Figure 2-2 from Bridgewater (2002a)]. PCBs were not detected in this area. High concentrations of all metals were detected in a 1-foot sample collected at PP-4. These results were some of the highest metal concentrations in samples collected throughout the Burgard Industrial site.

10.1.2. Riverbank Samples

☐ Yes ☒ No

10.1.3. Summary

Soil contaminated with PCBs was identified by EMS (1998) in the area just south of the Boydstun building in the southeast area. PAHs, PCBs, and TCLP lead were detected in TP-1, above DEQ's industrial maximum allowable soil concentrations (OAR 340-122-045) for those analytes. Follow-up sampling by Bridgewater (2002a) in the general area found no PCBs in soils. However, heavy oil, PAHs, and heavy metals were detected in near-surface soil samples at the Portland Blast Media wash pad and at the Western Machine Works compressor areas.

10.2. Groundwater

Groundwater samples have been collected from temporary well points, one monitoring well, and two industrial water supply wells located at the site. The two industrial water supply wells each were sampled once. The single monitoring well has been monitored routinely by Bridgewater since installation in January 2002.

10.2.1. Groundwater Investigations

☒ Yes ☐ No

In November and December 1997, 15 soil borings were completed by EMS during a site investigation at Boydstun Metal Works (southeast) [see Supplemental Figure 2 from EMS (1998)]. Groundwater samples were collected from temporary well point BH-13 [see Supplemental Figure 2 from ESM (1998)] and from an industrial water supply well (Well No. 5) located to the east of Boydstun Metal Works (southeast) [see Supplemental Figure 2-2 from Bridgewater (2002a)]. The groundwater samples were analyzed for soluble metals, TPH, and chlorinated and aromatic VOCs.

In December 2001 and January 2002, Bridgewater (2002a) completed four additional soil probe borings at the site. Temporary well points were installed in three of the soil borings and the fourth was completed as a permanent monitoring well (MW-7) [see Supplemental Figure 2-2 from Bridgewater (2002a)]. The groundwater sample collected from the monitoring well was analyzed for VOCs, PAHs, and metals. The groundwater samples collected from the temporary well points were analyzed for VOCs. Bridgewater (2002a) also collected a groundwater sample from an industrial water supply well (Well No. 3) located to the east of Portland Blast Media [see Supplemental Figure 2-2 from Bridgewater (2002a)] that was analyzed for VOCs.

Bridgewater (2003c) has continued groundwater monitoring at MW-7 since the 2001/2002 site investigation. The groundwater samples from this well have been analyzed for total metals, dissolved metals, VOCs, SVOCs, and PAHs.

The two industrial water supply wells (Well No. 3 and Well No. 5) were completed in 1944 with depths of 80 feet bgs. The wells appear to be screened in the alluvial groundwater zone (same water bearing zone as the monitoring wells and temporary well points). The Oregon Water Resources Department well identification numbers associated with these two wells are MULT 1827 and MULT 1828.

10.2.2. NAPL (Historic & Current)

☐ Yes ☒ No

No evidence of non-aqueous phase liquids has been reported.

10.2.3. Dissolved Contaminant Plumes

☒ Yes ☐ No

Groundwater samples collected during past investigations have had low detections of VOCs (chlorinated solvents) and dissolved metals. The specific constituents historically detected in groundwater are detailed in the table below. The most recent groundwater detections are detailed in a subsequent section.

VOCs	Dissolved Metals
Tetrachloroethene (PCE)	Arsenic
Trichloroethene (TCE)	Barium
1,1,1-Trichloroethane	Copper

Plume Characterization Status ☐ Complete ☒ Incomplete

Additional data are necessary to adequately characterize the identified chlorinated solvent and metals impacts to groundwater based on the distribution of available groundwater data.

Plume Extent

Groundwater samples collected at the site have had low concentrations of chlorinated solvents (total of PCE, TCE, and trichloroethane less than 5.3 µg/L). The highest concentrations of chlorinated solvents were detected in the two industrial water supply wells located along the eastern property boundary of Boydstun Metal Works (southeast) and Portland Blast Media (EMS 1998, Bridgewater 2002a). The source and extent of chlorinated solvents observed in groundwater at the site are unknown.

Min/Max Detections (Current situation)

The most recently reported groundwater data were collected in March 2003 (Bridgewater 2003c); however, Bridgewater indicates that another round of groundwater sampling was planned for September or October 2003. The minimum and maximum detections in groundwater from available documents are provided in the table below.

Analyte	Minimum Concentration (µg/L)	Maximum Concentration (µg/L)
Volatile Organic Compounds (VOCs)		
Tetrachloroethene (PCE)	< 1	1.91
Trichloroethene (TCE)	< 1	3.9
1,1,1-Trichloroethane	< 1	1.23
Dissolved Metals		
Arsenic	< 1	6.1
Barium	< 1	65.3
Copper	< 1	1.61

Current Plume Data

Only the single monitoring well (MW-7) has been monitored routinely [see Supplemental Figure 2-2 from Bridgewater (2002a)]. The other groundwater sampling locations – the temporary well points and two industrial water supply wells – were sampled only once. Therefore, GSI's estimate of the extent of the chlorinated solvent plume is based on historical data from the temporary well points and the two industrial water supply wells were used in conjunction with the current data for the monitoring well (see Figure 2). The estimated extent of the plume carries a high level of uncertainty due to the lack of groundwater data collected in the area.

The chlorinated solvents plume appears to extend beneath the Western Machine Works facility, the eastern Boydstun Metal Works building, and the Portland Blast Media facility. As noted above, the highest concentrations of chlorinated solvents were detected in the two industrial water supply wells located along the eastern edge of the Boydstun Metal Works (southeast) and Portland Blast Media facilities (EMS 1998; Bridgewater 2002a).

Preferential Pathways

No preferential groundwater pathways have been identified at the site.

Downgradient Plume Monitoring Points (min/max detections)

Based on available information, downgradient monitoring points have not been established during site investigations.

Visual Seep Sample Data ☐ Yes ☒ No

Not applicable.

Nearshore Porewater Data

Boydstun Metal Works (southeast), Western Machine Works, and Portland Blast Media facilities do not occupy the shoreline along the Willamette River or any of the slips. Nearshore porewater data were not collected as part of the site investigations.

Groundwater Plume Temporal Trend

All groundwater sampling locations were sampled during single events, except for monitoring well MW-7 that has been monitored routinely since construction in January 2002 [see Supplemental Figure 2-2 from Bridgewater (2002a)]. In 2002, the groundwater sample collected from MW-7 had a detection of PCE and was non-detect for all other VOCs. The subsequent groundwater sample collected in 2003 had a detection of TCE and was non-detect for all other VOCs.

10.2.4. Summary

The current groundwater data set consists of groundwater levels and groundwater analytical data collected from five temporary well points, one monitoring well, and two industrial water supply wells. Depth to groundwater measured in the wells ranged from 16 to 28 feet bgs. The general groundwater flow direction is anticipated to be to the west toward the Willamette River with local variations in flow direction expected around the slips (Bridgewater 2002a). However, site-specific information related to the groundwater flow direction and gradient was not available in the DEQ records.

Low concentrations of VOCs (chlorinated solvents) and dissolved metals have been detected historically in the alluvial groundwater zone. The highest concentrations of chlorinated solvents were detected along the eastern edge of the facilities, likely upgradient with respect to the general direction of groundwater flow. The source and extent of the chlorinated solvent plume is unknown.

10.3. Surface Water

10.3.1. Surface Water Investigation ☐ Yes ☒ No

10.3.2. General or Individual Stormwater Permit (Current or Past) ☒ Yes ☐ No

Permit Type	File Number	Start Date	Outfalls	Parameters/Frequency
Boydstun – GEN12Z	111395	11/13/96	#18 (WR-123)	Standard[1]/twice yearly
PBM – GEN12Z	Unknown	Unknown	#18 (WR-123)	Standard[1]/twice yearly

[1] Standard GEN12Z permit requirements include pH, oil and grease, total suspended solids, copper, lead, and zinc. *E. coli* may also be required.

Do other non-stormwater wastes discharge to the system? ☐ Yes ☒ No

10.3.3. Stormwater Data ☐ Yes ☒ No

10.3.4. Catch Basin Solids Data ☒ Yes ☐ No

A catch basin solids sample was collected from a stormwater catch basin at Western Machine Works property in 1997 and analyzed for TCLP metals. Only barium (1 mg/L) and chromium (0.33 mg/L) were detected in the sample (EMS 1998) at concentrations below characteristic waste levels.

10.3.5. Wastewater Permit ☐ Yes ☒ No

10.3.6. Wastewater Data ☐ Yes ☒ No

10.3.7. Summary

Stormwater from drainage basin 18, encompassing the Boydstun, Western Machine Works, and Portland Blast Media properties, is routed to a shared storm drain system that empties into the slip through private Outfall 18 (WR-123). Only Boydstun and Portland Blast Media have NPDES permits. A single catch basin solids sample collected at the Western Machine Works site revealed low levels of metals (EMS 1998).

10.4. Sediment

10.4.1. River Sediment Data ☐ Yes ☒ No

10.4.2. Summary

The southeast area of the Burgard Industrial Park is landlocked and is located over 1,000 feet from the International Terminals Slip and 0.5 mile from the main stem of the river. Other than communal stormwater runoff to private Outfall 18 (WR-123) within the slip, there are no direct migration pathways for contaminants originating in this area to reach the river.

Sediment sampling in the vicinity of private Outfall 18 (WR-123) has revealed some of the highest metals, PAH, and PCB (including PCB congeners, PCB-126 and PCB-169) concentrations in the Burgard Industrial Park area. However, it is difficult to identify a source of these contaminants as drainage basin 18 includes several land use activities, including NW Pipe, Ryerson and Sons, Boydstun Metal Works, Western Machine Works, Portland Blast Media, and various Schnitzer-owned properties.

11. CLEANUP HISTORY AND SOURCE CONTROL MEASURES

11.1. Soil Cleanup/Source Control

The following soil cleanup and source control measures have occurred in the southeast area:

- Removal of three underground storage tanks in 1988, including two 10,000-gallon diesel fuel tanks and one 10,000-gallon gasoline tank, from the Boydstun property.
- Daily removal of fine metal cuttings and blast media from pavement, pavement and containment provided for refueling truck, and replumbing of sink drain to the local sanitary sewer at Portland Blast Media.

Removal of near-surface contaminated soil in the Portland Blast Media wash pad and Western Machine Works compressor areas.

11.2. Groundwater Cleanup/Source Control

There is no groundwater cleanup history at Boydstun Metal Works, Western Machine Works, or Portland Blast Media.

11.3. Other

11.4. Potential for Recontamination from Upland Sources

See Final CSM Update.

12. BIBLIOGRAPHY / INFORMATION SOURCES

References cited:

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Figures:

Figure 1. Site Features
Figure 2. Extent of Impacted Groundwater

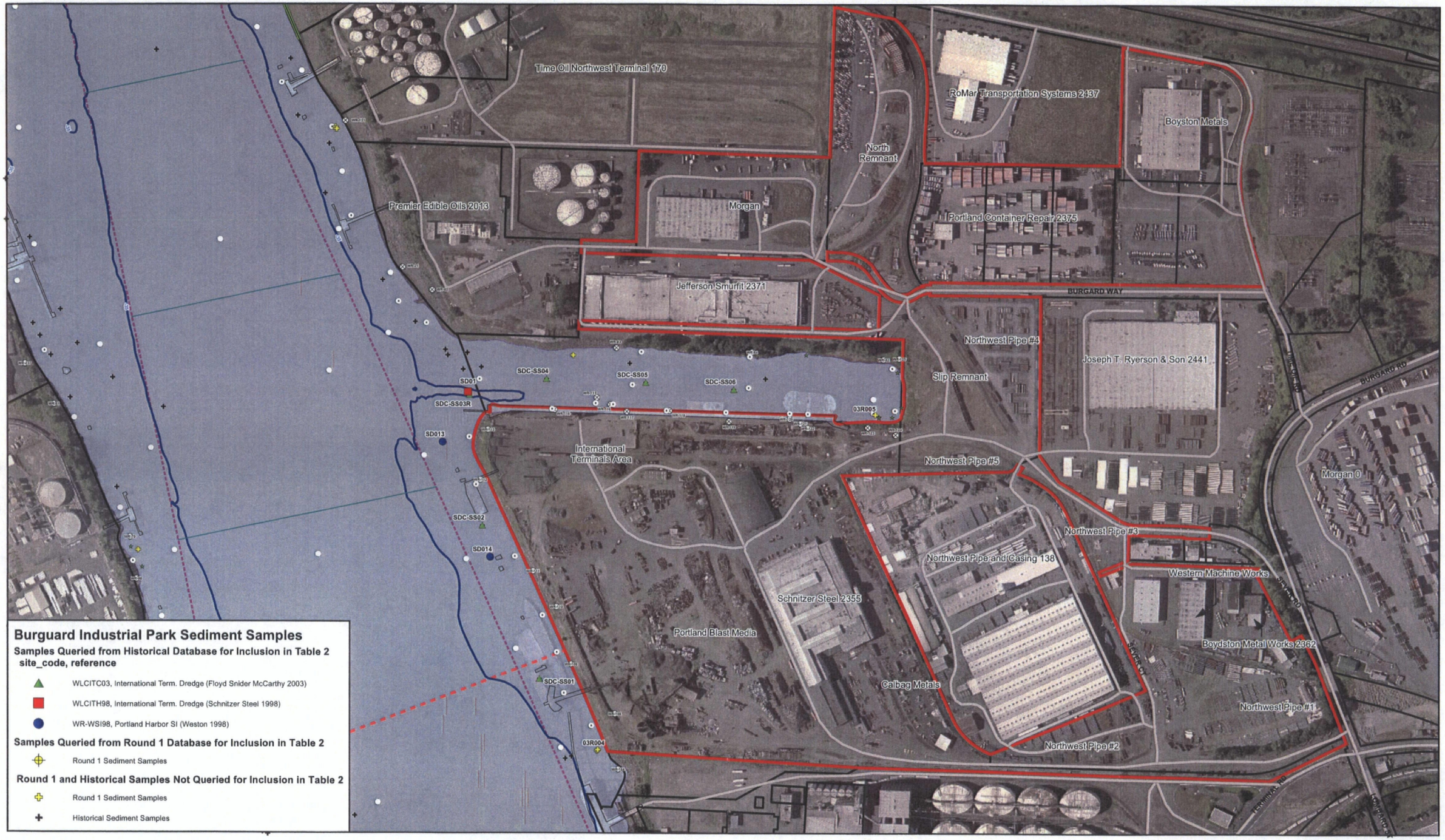
Tables:

Table 1. Potential Sources and Transport Pathways Assessment

Supplemental Scanned Figures:

Figure 2. Site Drainage Map (Columbia West Engineering 2001)
Figure 2. Site Diagram (EMS 1998)
Figure 2-2. Phase I Explorations-SE Area, Burgard Industrial Park (Bridgewater 2002a)

FIGURES



Burguard Industrial Park Sediment Samples

Samples Queried from Historical Database for Inclusion in Table 2
site_code, reference

- WLCITC03, International Term. Dredge (Floyd Snider McCarthy 2003)
- WLCITH98, International Term. Dredge (Schnitzer Steel 1998)
- WR-WSI98, Portland Harbor SI (Weston 1998)

Samples Queried from Round 1 Database for Inclusion in Table 2

- Round 1 Sediment Samples

Round 1 and Historical Samples Not Queried for Inclusion in Table 2

- Round 1 Sediment Samples
- Historical Sediment Samples

integral consulting inc.

LWG Lower Willamette Group

Map Document: (C:\GIS\Projects\Portland_Harbor\LWG-Map-Projects\Conseptual_Site_Model\Sample_Locations.mxd)
Plot Date: 03/08/2005

Areal Photo Date: October 2001.
Base Map features from Portland Metro's RLIS.

The City of Portland Outfall mapping information is based on available records; no warranty, expressed or implied, is provided as to the completeness or accuracy of the information. Current layer updated June 2004.

- City Outfalls
- City Outfalls (Abandoned)
- Non-City Outfalls
- Seep Photo Location (Not location of actual Seep)
- Selected ECSI Site Property Boundary
- -35ft. Contour (NAVD 88)
- River Miles
- Docks & In-water Structures
- Navigation Channel

Human Use Areas

- Dockside Worker
- Recreational Beach Use
- Transient

LWG Round 2 Proposed Sediment Samples

- Surface Sample Only
- Core & Surface Sample

0 150 300 600 Feet

DRAFT

DO NOT QUOTE OR CITE. This document is currently under review by US EPA and its federal, state, and tribal partners, and is subject to change in whole or in part.

Figure 1-Site Features
Portland Harbor RI/FS
Conceptual Site Model
Burgard Industrial Park
ECSI 2355

Groundwater Solutions Inc.

LWG Lower Willamette Group

0 150 300 Feet

FEATURE SOURCES:
Transportation, Water, Property, Zoning or Boundaries: Metro RLIS.
ECSI site locations were summarized in December, 2002 and January, 2003 from ODEQ ECSI files.

Map Creation Date: August 11, 2004

File Name: Fig2_Boydstun_SummaryMap.mxd

LEGEND

Site Boundary

Maximum Detection Location

Contaminant Type

VOCs (HVOCs)

Extent of Impacted Groundwater

For details, refer to plume interpretation table in CSM document.

Single or isolated detection of COI's. Extent or continuity of impacted groundwater between sample points is uncertain. Color based on contaminant type.

Estimated extent of impacted groundwater area. Color based on contaminant type.

Figure 2
Portland Harbor RI/FS
Burgard Industrial Park
Boydstun Metal Works
Upland Groundwater Quality Overview

TABLES

Table 1. Potential Sources and Transport Pathways Assessment

Boydstun Metal Works (and Western Machine Works, Portland Blast Media) #2362

Table 1. Potential Sources and Transport Pathways Assessment

Last Updated: March 4, 2005

Potential Sources	Media Impacted					COIs																Potential Complete Pathway				
						TPH			VOCs																		
Description of Potential Source	Surface Soil	Subsurface Soil	Groundwater	Catch Basin Solids	River Sediment	Gasoline-Range	Diesel - Range	Heavier - Range	Petroleum-Related (e.g. BTEX)	VOCs	Chlorinated VOCs	SVOCs	PAHs	Phthalates	Phenolics	Metals	PCBs	Herbicides and Pesticides	Dioxins/Furans	Butyltins	Overland Transport	Groundwater	Direct Discharge - Overwater	Direct Discharge - Storm/Wastewater	Riverbank Erosion
Upland Areas																										
A																										
Oil storage area along eastern boundary	✓	?					✓	✓																		
Contaminated soils near Western Machine and PBM	✓			✓				✓					✓			✓										
Stormwater private outfall 18					✓								✓			✓	✓									
Unknown source			✓								✓											?				
Overwater Areas																										
B																										
Other Areas/Other Issues																										

Notes:

All information provided in this table is referenced in the site summaries. If information is not available or inconclusive, a ? may be used, as appropriate. No new information is provided in this table.

✓ = Source, COI are present or current or historic pathway is determined to be complete or potentially complete.

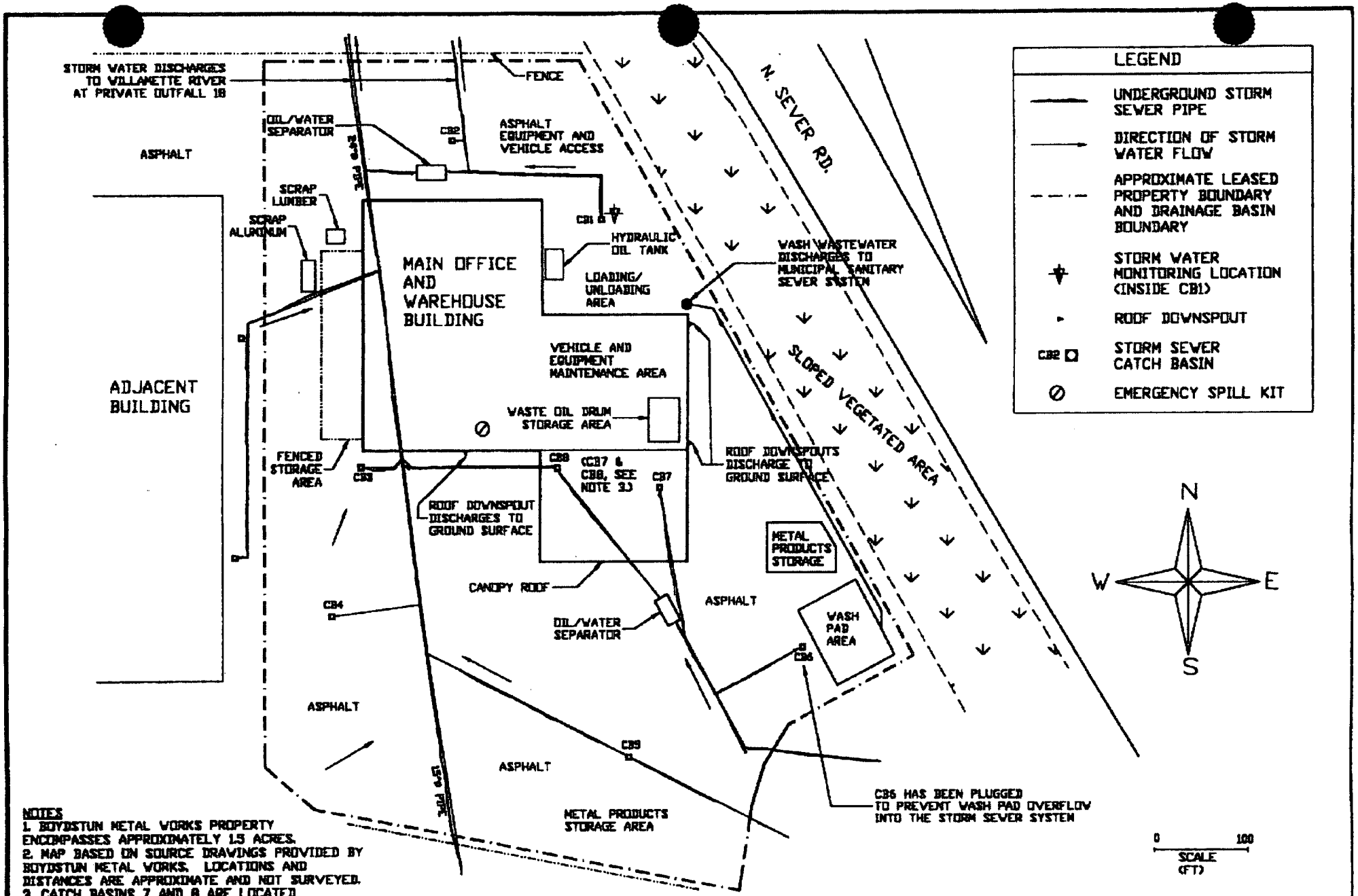
? = There is not enough information to determine if source or COI is present or if pathway is complete.

Blank = Source, COI and historic and current pathways have been investigated and shown to be not present or incomplete.

UST	Underground storage tank
AST	Above-ground storage tank
TPH	Total petroleum hydrocarbons
VOCs	Volatile organic compounds
SVOCs	Semivolatile organic compounds
PAHs	Polycyclic aromatic hydrocarbons
BTEX	Benzene, toluene, ethylbenzene, and xylenes
PCBs	Polychorinated biphenols

SUPPLEMENTAL FIGURES

Figure 2. Site Drainage Map (Columbia West Engineering 2001)
Figure 2. Site Diagram (EMS 1998)
Figure 2-2. Phase I Explorations-SE Area, Burgard Industrial Park (Bridgewater 2002a)



NOTES
1. BOYDSTUN METAL WORKS PROPERTY ENCOMPASSES APPROXIMATELY 1.5 ACRES.
2. MAP BASED ON SOURCE DRAWINGS PROVIDED BY BOYDSTUN METAL WORKS. LOCATIONS AND DISTANCES ARE APPROXIMATE AND NOT SURVEYED.
3. CATCH BASINS 7 AND 8 ARE LOCATED PARTIALLY INDOORS AND UNDER ROOF CANOPY AND WILL BE CAPPED TO PREVENT FLOW TO THE STORM SEWER SYSTEM.
4. CATCH BASIN TYPES AND STORM PIPE LOCATIONS ARE BASED UPON DISCUSSION WITH BOYDSTUN METAL PERSONNEL AND ARE ASSUMED TO BE LOCATED AND CONFIGURED AS SHOWN.
5. GROUND SURFACE IS IMPERVIOUS ASPHALT UNLESS OTHERWISE NOTED.

Columbia West Engineering

Design:	Drawn: DEL		
Checked: LVL	Date: 10-17-01		
Client: Boydstun	Rev	By	Date
Job No: 0161			
CAD File: FIGURE 2			
Scale: AS SHOWN			

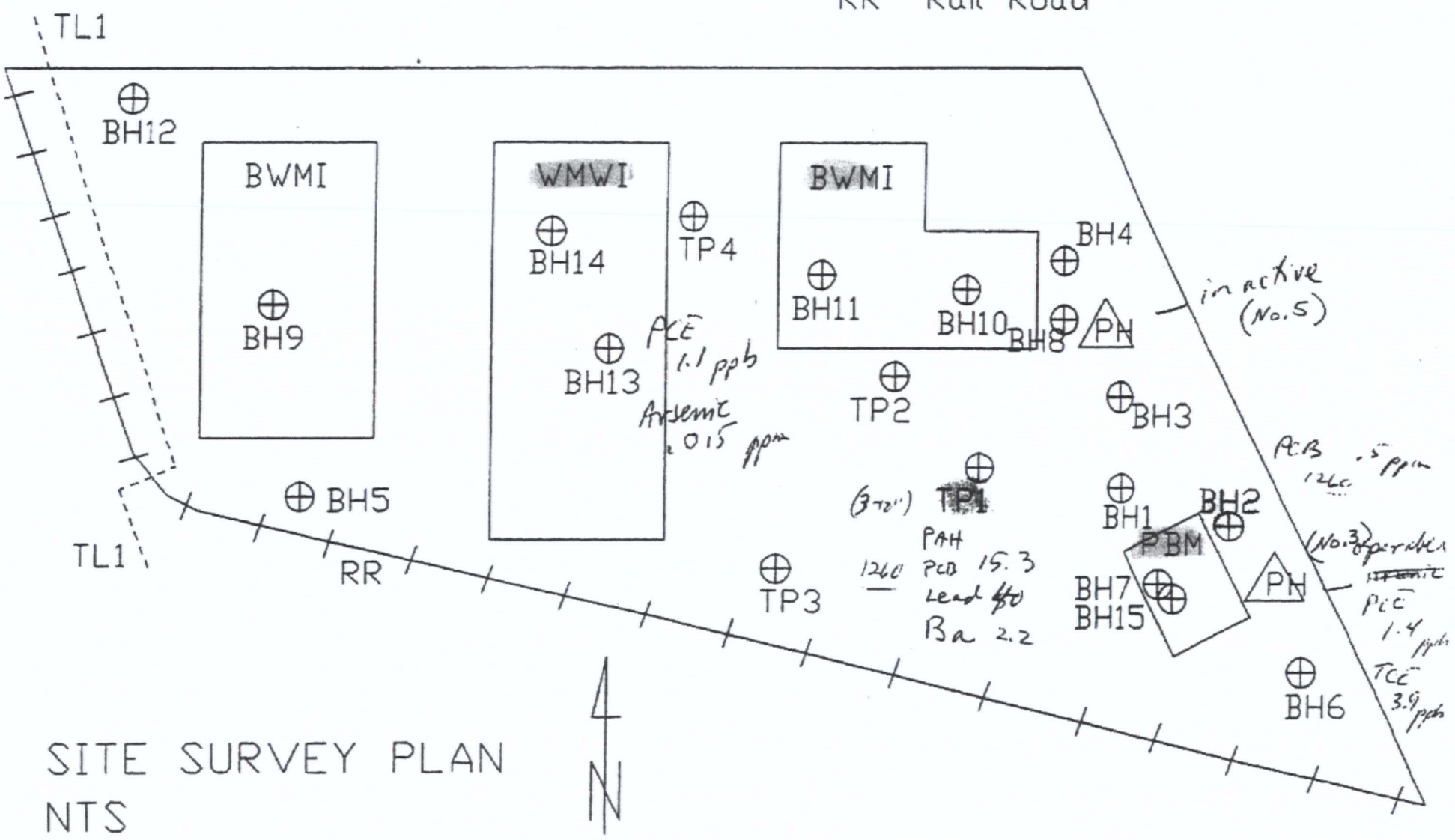
SITE DRAINAGE MAP

BOYDSTUN METAL WORKS
9002 N. SEVER COURT, PORTLAND, OREGON

FIGURE 2

FIGURE 2: SITE DIAGRAM

BH Bore Hole
PH Pump House
TL Trench Line
TP Test Pit
RR Rail Road



SITE SURVEY PLAN
NTS

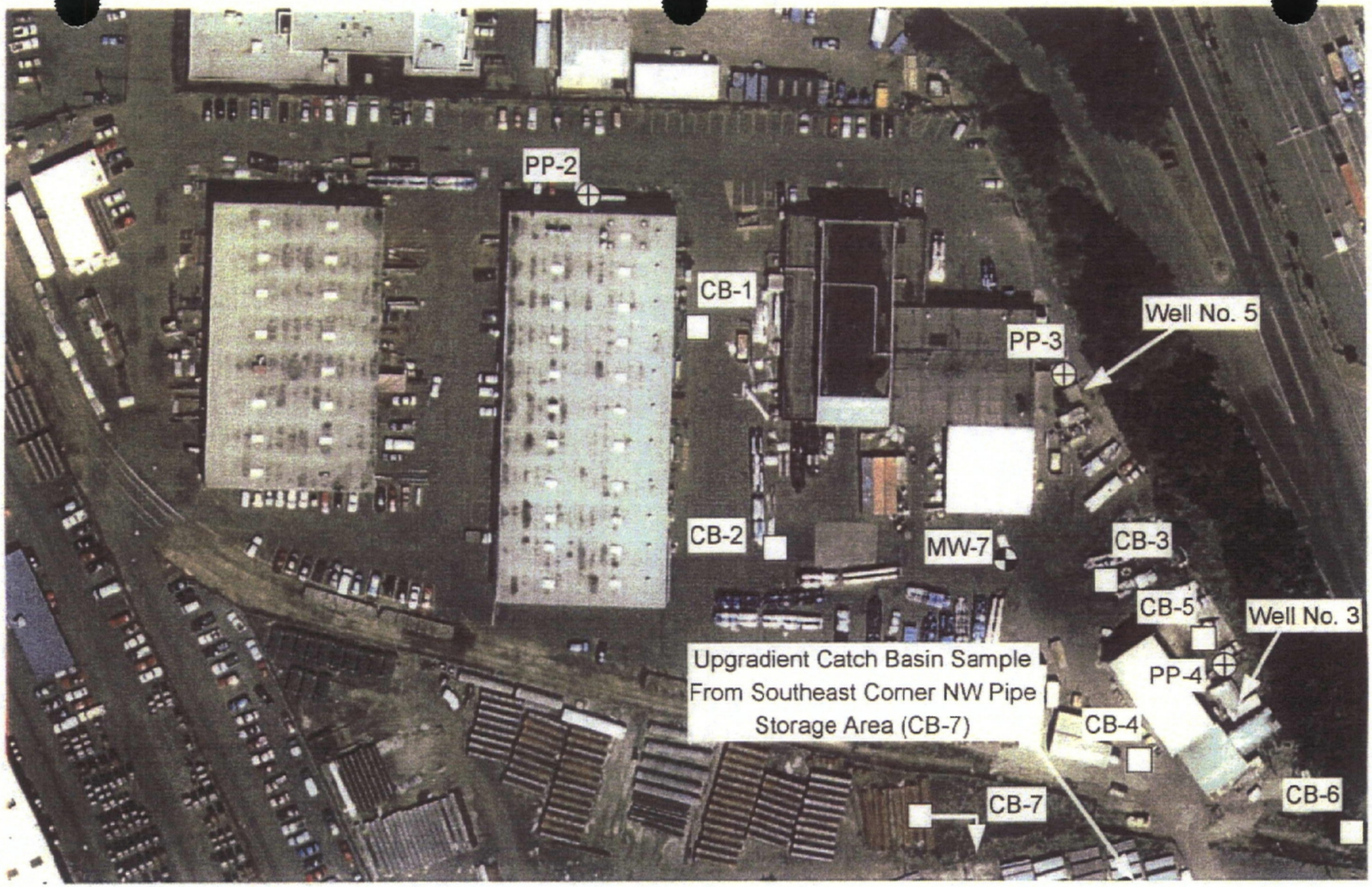


Figure 2-2
Phase I Explorations-SE Area
Burgard Industrial Park

BRIDGEWATER GROUP, INC.